Listing of Claims

1. (original): An isolated nucleic acid molecule encoding a polypeptide comprising the amino acid sequence of SEQ ID NO:2.

2. (original): The isolated nucleic acid molecule of claim 1 that comprises the nucleotide sequence of SEQ ID NO:1.

3. (currently amended): A nucleic acid molecule that is a complement to said isolated nucleic acid molecule of claim 1; wherein said complement is the complementary strand to said isolated nucleic acid molecule.

4. (currently amended): A ~~nucleotide sequence~~ polynucleotide that hybridizes under a stringent conditions to said complement of claim 3, provided that said ~~nucleotide sequence~~ polynucleotide does not encode a human, a murine, or a rat receptor activator of NF-κB ligand polypeptide; and wherein said stringent conditions include a hybridization temperature at 65°C, in 0.5M Na_2HP0_4, 7% SDS, and 0.5 mM EDTA , pH 8.0.

5. (original): The isolated nucleic acid molecule of claim 1 that is DNA or RNA.

6. (withdrawn): An isolated canine receptor activator of NF-κB ligand comprising the amino acid sequence of SEQ ID NO:2, or a fragment thereof, wherein said fragment binds to a canine receptor activator of NF-κB.

7. (withdrawn): The isolated canine receptor activator of NF-κB ligand of claim 6, wherein said fragment is selected from the group consisting of:

from about residue 10 to about residue 275 of SEQ ID NO:2;

from about residue 30 to about residue 275 of SEQ ID NO:2;

from about residue 50 to about residue 275 of SEQ ID NO:2;

from about residue 150 to about residue 275 of SEQ ID NO:2;
from about residue 250 to about residue 275 of SEQ ID NO:2;
from about residue 255 to about residue 275 of SEQ ID NO:2;
from about residue 235 to about residue 255 of SEQ ID NO:2;
from about residue 215 to about residue 235 of SEQ ID NO:2;
from about residue 195 to about residue 215 of SEQ ID NO:2;
from about residue 175 to about residue 195 of SEQ ID NO:2
from about residue 155 to about residue 175 of SEQ ID NO:2;
from about residue 135 to about residue 155 of SEQ ID NO:2;
from about residue 95 to about residue 135 of SEQ ID NO:2;
from about residue 75 to about residue 95 of SEQ ID NO:2;
from about residue 55 to about residue 75 of SEQ ID NO:2;
from about residue 35 to about residue 55 of SEQ ID NO:2;
from about residue 15 to about residue 35 of SEQ ID NO:2;
from about residue 1 to about residue 15 of SEQ ID NO:2;
from about residue 125 to about residue 160 of SEQ ID NO:2;
from about residue 119 to about residue 153 of SEQ ID NO:2;
from about residue 175 to about residue 200 of SEQ ID NO:2;
from about residue 183 to about residue 192 of SEQ ID NO:2;
from about residue 200 to about residue 225 of SEQ ID NO:2;
from about residue 204 to about residue 211 of SEQ ID NO:2;
from about residue 195 to about residue 215 of SEQ ID NO:2;
from about residue 221 to about residue 227 of SEQ ID NO:2;
from about residue 110 to about residue 140 of SEQ ID NO:2; and
any combination thereof.

8. (withdrawn): An immunogenic composition that comprises the canine receptor activator of NF-κB ligand of claim 6.

9. (withdrawn): The immunogenic composition of claim 8, that further comprises one or more additional elements selected from the group consisting of:

(a) a foreign T helper lymphocyte epitope,

(b) an element that targets the canine receptor activator of NF-κB ligand immunogenic composition to an antigen presenting cell or a B-lymphocyte,

(c) an element that stimulates the immune system, and

(d) an element that optimizes presentation of the canine receptor activator of NF-κB ligand to the immune system.

10. (withdrawn): The immunogenic composition of claim 9, wherein the canine receptor activator of NF-κB ligand is part of a fusion polypeptide.

11. (withdrawn): The immunogenic composition of claim 9 that further comprises a duplication of at least one element selected from the group consisting of a receptor activator of NF-κB ligand B-cell epitope, a hapten and a combination thereof.

12. (withdrawn): The immunogenic composition of claim 9, wherein said T-cell epitope is immunodominant in a mammal to be treated.

13. (withdrawn): The immunogenic composition of claim 9, wherein said foreign T-cell epitope is selected from the group consisting of a natural promiscuous T-cell epitope and an artificial MHC-II binding peptide sequence.

14. (withdrawn): The immunogenic composition of claim 13, wherein said natural promiscuous T-cell epitope is selected from the group consisting of a Tetanus toxoid epitope, a diphtheria toxoid epitope, an influenza virus hemagluttinin epitope, and a *P. falciparum* CS epitope.

15. (withdrawn): The immunogenic composition of claim 14, wherein said Tetanus toxoid epitope is a Tetanus toxoid P2 epitope or a Tetanus toxoid P30 epitope.

16. (withdrawn): The immunogenic composition of claim 9 (b), wherein said targeting element is selected from the group consisting of a substantially specific

binding partner for a B-lymphocyte specific surface antigen, an APC specific surface antigen for which there is a receptor on the B-lymphocyte and the APC, and a combination thereof.

17. (withdrawn): The immunogenic composition of claim 9(c), wherein said immune system stimulating element is selected from the group consisting of a cytokine, a hormone, and a heat-shock protein.

18. (withdrawn): The immunogenic composition of claim 17, wherein the cytokine is selected from the group consisting of interferon *gamma*, Flt3L, interleukin 1, interleukin 2, interleukin 4, interleukin 6, interleukin 12, interleukin 13, interleukin 15, granulocyte-macrophage colony stimulating factor, and an effective fragment thereof: and wherein, the heat-shock protein is selected from the group consisting of HSP70, HSP90, HSC70, GRP94, calreticulin, and an effective fragment thereof.

19. (withdrawn): The immunogenic composition of claim 9 (d), wherein said immune system presenting element is a lipid selected from the group consisting of a palmitoyl group, a myristyl group, a farnesyl group, a geranyt-geranyl group, a GPI-anchor, and an N-acyl diglyceride group.

20. (withdrawn): The immunogenic composition of claim 9 that comprises

(i) at least two copies of the receptor activator of NF-κB ligand polypeptide or the fragment thereof, or

(ii) a modified receptor activator of NF-κB ligand polypeptide or a modified fragment thereof, wherein the modified receptor activator of NF-κB ligand polypeptide or modified fragment thereof is linked to a carrier molecule.

21. (withdrawn): A vaccine composition comprising an effective amount of the receptor activator of NF-κB ligand immunogenic composition of claim 6, and a pharmaceutically acceptable carrier.

22. (withdrawn): The vaccine composition of claim 21 further comprising a suitable adjuvant.

23. (withdrawn): The vaccine composition of claim 22 wherein the adjuvant facilitates breaking of autotolerance to autoantigens.

24. (withdrawn): The vaccine composition of claim 22 wherein the adjuvant is selected from the group consisting of: Adjuvant 65, Freund's complete or incomplete adjuvant, aluminum hydroxide, aluminum phosphate, alum, hexadecylamine, octadecylamine, lysolecithin, dimethyldioctadecylammonium bromide, N,N-dioctadecyl-N',N'-bis(2-hydroxymethyl) propanediamine, methoxyhexadecylglycerol, pluronic polyols; polyanions, pyran, dextran sulfate, poly IC, polyacrylic acid, carbopol; muramyl dipeptide, dimethylglycine tuftsin, oil emulsions and combinations thereof.

25. (withdrawn): An antibody or antibody fragment that selectively binds to the canine receptor activator of NF-κB ligand comprising the amino acid sequence of SEQ ID NO:2.

26. (withdrawn): The antibody of claim 25 that is a monoclonal antibody.

27. (withdrawn): A method for inhibiting canine receptor activator of NF-κB ligand activity in a mammal, comprising administering to the mammal an amount of the antibody or fragment thereof of claim 25 that is effective to inhibit canine receptor activator of NF-κB ligand activity in the mammal.

28. (withdrawn): The method of claim 27 wherein the antibody or fragment thereof is administered at a frequency and for a duration sufficient to maintain bone mass or bone density in the mammal at a level equal to or greater than the bone mass or bone density measured prior to the step of administering the antibody or fragment thereof.

29. (withdrawn): A method for inhibiting receptor activator of NF-κB ligand activity in a mammal, comprising administering to the mammal an amount of a receptor activator of NF-κB ligand immunogenic composition of claim 6, that is effective to elicit antibodies that selectively bind to the receptor activator of NF-κB ligand in the mammal.

30. (withdrawn): The method of claim 29 wherein the mammal is selected from the group consisting of a canine, an equine, a feline, a bovine, a porcine and a human.

31. (withdrawn): A method for treating conditions in a mammal characterized by excess resorption of bone, comprising immunizing a mammal with an effective amount of the canine receptor activator of NF-κB ligand immunogenic composition of claim 6.

32. (currently amended): An isolated nucleic acid molecule comprising an open reading frame encoding ~~the~~ a canine receptor activator of the NF-κB ligand ~~immunogenic composition of claim 6~~ comprising the amino acid sequence of SEQ ID NO:2, or a fragment thereof, wherein said fragment binds to a canine receptor activator of NF-κB

33. (original): The nucleic acid molecule of claim 32 that is RNA or DNA.

34. (original): A replicable nucleic acid vector comprising the nucleic acid molecule of claim 32.

35. (original): The replicable nucleic vector of claim 34 selected from the group consisting of a plasmid, a phage, a cosmid, a mini-chromosome, and a virus.

36. (original): The replicable nucleic vector of claim 34 that is suitable for expression of the vector by a eukaryotic host cell, a prokaryotic host cell, or both.

37. (original): The replicable nucleic vector of claim 34, comprising a suitable promotor operably linked 5' to the open reading frame of the canine receptor activator of NF-κB ligand immunogenic composition.

38. (original): The replicable nucleic vector of claim 37 further comprising an operably linked nucleic acid sequence encoding a leader peptide enabling secretion or membrane integration of the canine receptor activator of NF-κB ligand immunogenic composition.

39. (original): A host cell comprising the replicable nucleic acid vector of claim 34.

40. (original): The host cell of claim 39 that is a microorganism selected from the group consisting of a bacterium, a yeast, and a protozoan.

41. (original): The host cell of claim 39 that is derived from a multicellular organism selected from a fungus, an insect cell, a plant cell, and a mammalian cell.

42. (original): A method of producing a canine receptor activator of NF-κB ligand comprising culturing the host cell of claim 39 under conditions suitable for expressing the canine receptor activator of NF-κB ligand.

43. (withdrawn): A method for inhibiting receptor activator of NF-κB ligand activity in a mammal, comprising administering to the mammal an amount of a

nucleic acid vector of claim 34, wherein the nucleic acid vector is suitable for expressing canine receptor activator of NF-κB ligand *in vivo* in the mammal, thereby eliciting an immune response effective to inhibit receptor activator of NF-κB ligand activity in the mammal.

44. (withdrawn): A stable cell line comprising the vector of claim 34.

45. (withdrawn): The stable cell line of claim 44 that secretes a canine receptor activator of NF-κB ligand immunogenic composition or that expresses a canine receptor activator of NF-κB ligand immunogenic composition on its surface.

Claims 46-47. (canceled)

48. (new): A replicable nucleic acid vector comprising the nucleic acid molecule of claim 1.

49. (new): A host cell comprising the replicable nucleic acid vector of claim 48.

50. (new): A replicable nucleic acid vector comprising the nucleic acid molecule of claim 2.

51. (new): A host cell comprising the replicable nucleic acid vector of claim 50.